1   processing capacity.[82] Therefore, the cost driver is ports, and the EPHC costs

2   should be assigned to the ports.[83]

3 Q. **WHAT SCIS COST OUTPUT CATEGORIES SHOULD BE ASSIGNED**
4   **TO THE PEAK PERIOD USAGE CATEGORIES?**

5 A. The Line CCS categories (ISDN and non-ISDN), the D Channel Access PPS, PPB

6   Channel Access PPS, and Inter-Switch PPS[84] and SS7 link costs should all be

7   assigned to the traffic sensitive category, because this equipment is engineered

8   and purchased based on peak period usage.[85]

9   The trunk costs are separated and assigned to the common trunk MOU,

10   which is also peak period usage sensitive.[86]

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[82] This can be seen in the Line Termination output reports from SCIS that will always show "Excess SM EPHC Capacity Inv." (subcategory of the "Part C" costs in the Line Termination Investment) assigned to every port because the port capacity of the switch module was reached before the usage capacities could be completely utilized. These excess capacity categories are labeled 'Part C' of the Line termination costs.

[83] AT&T/WorldCom's restated switch cost study has computed a port additive factor to assign the getting started and EPHC costs to the ports. The factor development can be seen in the Restated Workpapers, Section #5.9 EO Material Investment. The factor is then entered into V-Cost, using Verizon's port utilization inputs. This was done to avoid having to make algorithm changes to V-Cost.

[84] These categories reflect equipment engineered based on either voice busy hour minutes of use or ISDN data busy second packet usage.

[85] Please refer to Ms. Murray's Direct Testimony regarding the difficulties of developing pricing structures for peak period costs.

[86] Note that Verizon's analysis initially and temporarily assigns trunk ports to the non-usage costs in the cost study (see Subsection #5.9, page 2) to isolate the local switch usage costs to develop the switch MOU rate element. The trunk costs are subsequently isolated from the non-usage category and assigned appropriately in the Digital Trunk Port development that is then used to calculate the common trunk MOU cost.

1   Q.   **HOW MUCH OF THE TOTAL SWITCH INVESTMENT IS TRAFFIC-**
2   **SENSITIVE?**

3   A.   A very small percentage of the overall investment in current digital switch

4   technology is engineered based on peak period usage. The allocation of the SCIS

5   outputs to the traffic sensitive and non-traffic sensitive categories can be seen in

6   Attachment 5.[87]

7   Q.   **HOW DOES THIS RELATE TO THE MODIFIED SYNTHESIS MODEL**
8   **INPUT USED TO ALLOCATE SWITCH COSTS TO PORT AND MOU**
9   **RATE ELEMENTS WHEN THE FLAT-RATED PORT OPTION IS NOT**
10   **USED?**

11   A.   The information in Attachment 5 described above can be used in the Modified

12   Synthesis Model to allocate switch costs to port and MOU rate elements.[88]

13   **G. RIGHT-TO-USE FEES ARE UNSUBSTANTIATED AND SHOULD BE**
14   **REJECTED, AND THE RIGHT-TO-USE FEES ARE MISASSIGNED**
15   **TO THE USAGE SENSITIVE RATE ELEMENTS.**

16   Q.   **HOW DID VERIZON DETERMINE THE COSTS OF RIGHT-TO-USE**
17   **(RTU) SOFTWARE?**

18   A.   Verizon's right-to-use software cost is an allocation of an annualized software

19   expense for Verizon-East based on historical data for 1999 and 2000, plus

20   forecasts for 2001 and 2002.

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[87]   The percentage of Verizon's total switch investment that is peak period usage related,
        including trunks, is also identified in the Restated Workpapers Subsection 5.9 EO
        Material Inv. (electronic workpapers AT&T VA_Part C-8-1 Switch MOU Supp(1).xls.

[88]   The 40% traffic sensitive input to the Synthesis Model referenced in Ms. Pitts' Direct
        Testimony was not implemented, and the FCC's default inputs were used. These
        estimates are superseded by the actual Verizon percentage data set forth in Attachment 5.

1   Q.   **IS THE TOTAL FORECASTED RTU AMOUNT APPROPRIATE?**

2   A.   It is difficult to determine if the RTU amount is appropriate, because Verizon did

3   not provide any supporting documentation for the high level estimates it used.

4   Q.   **WHY DO YOU QUESTION THE VERIZON-EAST RTU FEE AMOUNTS?**

5   A.   RTU fees can vary dramatically, as is illustrated by Verizon's own cost study

6   workpapers in this proceeding.[89] Verizon included 1999 data that appear to be

7   inconsistent with data from other years and much higher than its more recent

8   software expenditures and forecasts. The inclusion of this 1999 data seriously

9   inflated the annual estimate of costs. In the absence of Verizon's full explanation

10   of the significant spike in 1999 costs, those 1999 costs should be excluded from

11   the calculations.

12   Q.   **SHOULD VERIZON'S CURRENT RTU EXPENDITURES BE USED TO**
13   **DETERMINE FORWARD-LOOKING RTU FEES IN A TELRIC STUDY?**

14   A.   No. Verizon's embedded RTU expenditures can include software purchases

15   necessary to update older switches. As discussed previously, a TELRIC study

16   requires a completely new network to be built that would eliminate the need to

17   upgrade older generation switches that should not be reflected in a forward-

18   looking environment. A large spike in expenditures, such as Verizon's 1999

19   costs, could also be the result of a one-time only RTU purchase that provides

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[89]   *See* Verizon RTU Factor Study Part G-9, Sheet labeled "Workpaper 1_Pg1" showing
       expenditures for 1999 and 2000 and estimated expenditures for 2001 and 2002 in
       columns D-F. The 1999 expenditure is more than twice as high as any other year.

1   switch software functionality for the rest of the life of the switches, requiring a

2   longer time period to amortize than Verizon's assumption of four years.

3   **Q.   WHAT CORRECTIONS DO YOU SUGGEST?**

4   A.   The minimal amount of information provided by Verizon does not allow us to

5   make any in-depth review or recommendations.[90] If further information is

6   provided regarding these fees, AT&T/WorldCom may file Supplemental

7   Testimony. However, at a minimum, the RTU factor should be recalculated,

8   excluding the unusually high RTU fees in 1999. AT&T/WorldCom's restated

9   rates excluded the 1999 data and recomputed the RTU factor based on the three

10   other years of data provided by Verizon.[91]

11   **Q.   HAS VERIZON ASSIGNED THE UNSUBSTANTIATED RTU COSTS TO**
12   **UNE RATES IN AN APPROPRIATE MANNER?**

13   A.   No. Verizon has inappropriately assigned the RTU costs to the minute-of-use

14   UNE rate element when these costs should be assigned to the ports.

15   **Q.   HOW DOES VERIZON INCUR RIGHT-TO-USE COSTS?**

16   A.   Verizon typically pays RTU fees either on a per-switch or per port-basis, or as part

17   of a larger buy-out contract that could cover all of Verizon's switches.[92] Buy-out

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[90]   *See* Verizon's response to AT&T's Data Request Number 9, Requests 7(c),(h),(i),(j).

[91]   Using three years of data is consistent with other areas of Verizon's study, such as the line growth data provided in response to AT&T Data Request 9-12. *See* Attachment 6 for the RTU factor recalculation.

[92]   Verizon confirmed that it negotiates fees for right-to-use licenses on a buyout basis in its response to AT&T Request Number 9, Request 44.

1 contracts allow an ILEC to purchase software for all (or sometimes a subset) of its

2 switches, rather than purchasing the software on a per-switch or per-line basis.

3 The implicit cost driver would be the total number of switches that the buy-out

4 covers.

5 **Q. ARE RTU FEES EVER PAID BASED ON MINUTES-OF-USE OR**
6 **CALLS?**

7 A. RTU fees are the same without regard to the number of calls or minutes of use of

8 a switch, and we have never seen RTU fees charged by the switch manufacturer

9 on a minute of use or call basis. Thus, even if Verizon could substantiate its

10 software costs, they should be allocated to the non-traffic sensitive switch port

11 rates, and not to the traffic sensitive minute-of-use rates.

12 **Q. WHY RECOVER RTU COSTS VIA THE PORTS?**

13 A. RTU costs are incurred primarily on a per-switch basis (or directly on a per-port

14 basis). Exhaustion of ports is the cost driver for the purchase of an additional

15 switch and the incurrence of additional RTU fees. Cost causation principles are

16 best served by allocating RTU fees to the ports in the same manner as the "getting

17 started" costs, and in the same manner that Verizon incurs its costs.

18 AT&T/WorldCom's restated minute-of-use costs exclude the RTU fee and

19 assign a recomputed RTU fee to the port elements.[93]

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[93] The corrected Verizon RTU factor described above must be further recomputed because it is being applied to a different amount of switch investment (AT&T's proposed non-traffic sensitive investment) than the amount in Verizon's study. *See* Attachment 5 for this recomputation.

1   **H. SWITCH ENGINEERING AND INSTALLATION**
2   **FACTORS ARE OVERSTATED**

3   **Q.**   **WHAT IS THE SWITCH EF&I FACTOR?**

4   A.   The engineering, furnished and installed ("EF&I") factor is the loading factor used

5   to add items such as vendor engineering, Verizon engineering, vendor installation

6   and Verizon installation, and sales tax in order to convert the material-only cost of

7   a switch to a fully installed cost.

8   **Q.**   **HOW DID VERIZON COMPUTE ITS EF&I FACTOR?**

9   A.   Verizon used Verizon-East region-wide embedded data from its Detailed

10   Continuing Property Records (DCPR) to calculate its EF&I factor. The Verizon

11   EF&I factor was derived by comparing the material cost of the equipment to the

12   total installed cost of the equipment.

13   **Q.**   **DOES VERIZON'S CALCULATION PRODUCE A REASONABLE EF&I**
14   **FACTOR?**

15   A.   No. Verizon's EF&I factor is unreasonably high.

16   **Q.**   **DOES VERIZON PROVIDE ANY JUSTIFICATION FOR ITS HIGH EF&I**
17   **COSTS?**

18   A.   No. Verizon response to AT&T Data Request Number 9, Request 31 seeking

19   detailed DCPR data supporting Verizon's claimed EF&I factor provided only a

20   column called "installed investment" without any data that underlie the

21   installation costs. The integrity of the DCPR data is in question given the FCC's

22   December 1998, audit findings of Verizon's Continuing Property Records.

1   In the Massachusetts UNE proceeding, VZ-MA admitted that it always

2   performs its own engineering and installation and does not put such work out to

3   competitive bid.[94] As a result, marketplace competitive pressures that encourage

4   efficiencies are absent, and reliance on this data to calculate a forward-looking

5   TELRIC EF&I factor to be applied throughout the VZ-East region is inappropriate

6   unless Verizon demonstrates that the Verizon costs are competitive with the

7   marketplace. Verizon has not made this showing.[95]

8 **Q.   WHAT DO YOU PROPOSE IS THE REASONABLE FORWARD-**
9 **LOOKING VENDOR PORTION OF THE EF&I FACTOR?**

10 A.   SCIS can compute the vendor engineering and installation portion of the

11   engineering and installation factor as it calculates both [1] material-only or [2]

12   vendor EF&I costs. AT&T/WorldCom used the EF&I data from the SCIS/MO

13   outputs to develop an appropriate vendor EF&I factor.[96]

14 **Q.   WHAT DOES AT&T/WORLDCOM PROPOSE AS A REASONABLE**
15 **FORWARD-LOOKING EF&I FACTOR TO BE USED AS THE INPUT TO**
16 **VCOST?**

17 A.   Given the questions raised by Verizon's incomplete documentation and by the

18   FCC's audit of the underlying data that Verizon relies on to develop the EF&I

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[94]   *See* Verizon's response to AT&T's Request Number 3, Request 4 in the Massachusetts UNE proceeding DTE-01-20.

[95]   EF&I Factors were provided by many companies in the FCC's 1992 Open Network Architecture filings. The average EF&I factor was 10%. In addition, an 8% EF&I factor was decided upon in the FCC's USF proceeding, see In the Matter of Federal-State Joint Board on Universal Service, CC Docket Nos. 96-45, 97-160, FCC 99-304 (rel. Nov. 2, 1999), at ¶307.

[96]   *See* Attachment 2.

1   factor, use of an earlier Verizon factor is appropriate to determine the local

2   telephone company portion of the EF&I factor. Verizon used a .1080 factor in its

3   February 13, 1992 filing of additional cost information and workpapers in

4   response to the FCC's MOO DA 92-128 released January 31, 1992 (ONA Tariff

5   Order). AT&T/WorldCom used the EF&I data from the SCIS/MO outputs for the

6   vendor portion of the factor in conjunction with the Virginia sales tax and the

7   11% Verizon portion of the factor to develop a reasonable EF&I factor that is

8   approximately 60% of Verizon's claimed factor.

9   **I. RECIPROCAL COMPENSATION RATES SHOULD BE**
10   **CALCULATED USING UNE SWITCH RATES**

11 Q. **DOES VERIZON INCLUDE THE SAME SWITCHING COSTS IN THE**
12   **DEVELOPMENT OF RECIPROCAL COMPENSATION AND UNE**
13   **SWITCH RATES?**

14 A. In its response to data requests, Verizon admitted that the switch processing of

15   UNE traffic and reciprocal compensation traffic is the same.[97] Notwithstanding

16   this admission, Verizon has arbitrarily chosen not to include the substantial

17   "getting started" costs and RTU fees in the reciprocal compensation rates, even

18   though it included these same costs in its UNE usage rates.[98]

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[97] *See* Verizon's response to AT&T Data Request Number 9, Request 22: "On a strictly technical basis, the switch does not treat either type of terminating call differently. However, Verizon VA has allocated the costs differently."

[98] *See* Verizon's response to AT&T Data Request Number 9, Request 23.

1   Q.   **HOW DOES VERIZON JUSTIFY ITS DECISION TO INCLUDE THESE**
2   **COSTS IN UNE SWITCH USAGE COSTS AND NOT IN RECIPROCAL**
3   **COMPENSATION COSTS?**

4   A.   Verizon claims it is including only incremental costs of the *additional* traffic

5   associated with terminating other carriers' traffic. Verizon claims that reciprocal

6   compensation traffic does not cause a burden to processing capacity (or apparently

7   cause any increase to RTU fees), and as a result, Verizon excluded both "getting

8   started" costs and RTU fees from reciprocal compensation.[99]

9   Q.   **IS VERIZON'S EXPLANATION REASONABLE?**

10   A.   No. The same argument that Verizon makes about reciprocal compensation also

11   applies to UNE traffic. Verizon is seeking to maximize its UNE revenues and

12   minimize the costs of reciprocal compensation that Verizon pays.

13   Q.   **ARE THERE MODIFICATIONS YOU ARE RECOMMENDING TO**
14   **VERIZON'S STUDY THAT WILL VIRTUALLY ELIMINATE THIS**
15   **PROBLEM?**

16   A.   Yes. As discussed above, the "getting started" cost of a switch and its RTU fee

17   should not be included in the traffic sensitive UNE elements but properly belong

18   in the non-traffic sensitive port elements. When this correction is made, the

19   argument about assignment of "getting started" costs and RTU fees to UNEs or

20   reciprocal compensation is moot because the costs are fully (and properly)

21   assigned to the ports.

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[99]   *See* Panel testimony at 204.

1   If, however, the Commission does not accept AT&T/WorldCom's

2   proposal to assign the "getting started" cost and the RTU fees to the ports, then

3   these costs must be fairly apportioned to all traffic, including reciprocal

4   compensation, and not just to UNE switch usage rates.[100]

5   **J. SUMMARY AND CONCLUSION**

6 **Q. PLEASE SUMMARIZE THIS PORTION OF YOUR TESTIMONY**

7 A. Although severely limited by untimely responses and lack of data requested in

8   discovery, we have identified fundamental flaws in Verizon's switch cost study

9   that create severe overstatements in switch UNE elements. The flaws include use

10   of an incorrect short-run growth-only switch price for a long-run study, a flawed

11   methodology for developing discount inputs, understatement of port utilization

12   inputs, RTU fees and feature port additives based on questionable inputs (for

13   which Verizon has failed to provide appropriate supporting information), an EF&I

14   factor that is too high, misallocation of non-traffic sensitive port-related costs to

15   the local switch usage rate element, and use of inconsistent assumptions for UNE

16   and reciprocal compensation cost development.

17 **Q. PLEASE STATE YOUR CONCLUSIONS.**

18 A. Verizon's cost study is fatally flawed and should be rejected. If the Commission

19   does not accept the modified Synthesis Model sponsored by Mr. Pitkin and its

20   results as a foundation for switch UNE costs, then Verizon's study must be

---

[100]   This correction needs to be made in both the end office switch and the tandem switch
(footnote continued)

1   corrected as described herein. AT&T/WorldCom's restated switch rates include

2   the corrections recommended in this testimony.

3   **V.   TRANSPORT**

4   **A. INTRODUCTION AND PURPOSE OF TESTIMONY**

5 **Q.**   **PLEASE DESCRIBE THE PURPOSE OF THIS PORTION OF THE**
6   **PANEL TESTIMONY AND PROVIDE A SUMMARY OF ITS**
7   **CONCLUSIONS.**

8 A.   This testimony reviews Verizon's claimed interoffice transport and common (also

9   known as shared) transport costs as presented in Verizon's Direct Panel

10   Testimony. This testimony identifies and explains the errors that Verizon VA

11   made with regard to both and recalculates the interoffice transport and common

12   transport costs to correct these errors.

13   Verizon VA has significantly overstated its forward-looking economic

14   costs for dedicated interoffice transport and common transport. In particular,

15   Verizon VA made the following errors:

16   •   For dedicated interoffice transport, Verizon VA made fundamental

17   methodological errors in its study. The most significant error is Verizon

18   VA's understatement of the capacity of the SONET rings used to provide

19   dedicated interoffice transport in its study, thereby significantly overstating

20   the costs for the circuits riding those SONET rings.

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investments.

1. • Verizon VA's cost study also improperly includes Digital Cross-connect
2.   System ("DCS") on most dedicated transport circuits even though the
3.   competitive local exchange carrier ("CLEC") may not want this element.
4.   Consistent with the FCC's Advanced Services Order and with the terms of
5.   the Verizon VA/AT&T and Verizon VA/MCImetro interconnection
6.   agreements, DCS should be treated as a separate unbundled element,
7.   which a CLEC has the option to purchase based on cost and network
8.   considerations.

9. • Verizon VA's installation factor for transport equipment is significantly
10.   higher than even Verizon's own data demonstrates to be reasonable.

11. • Verizon VA has failed to provide rates for DS1 to DS0 and DS3 to DS1
12.   multiplexing even though this network element is essential for dedicated
13.   transport and is normally included in Verizon's cost studies for interoffice
14.   dedicated transport.

15. • Verizon VA has also significantly overstated the costs for common
16.   transport. Verizon VA has based the cost for common transport on its
17.   dedicated transport cost study. Thus, errors described in our testimony
18.   relating to dedicated transport must also be corrected with regard to
19.   common transport costs.

1
2

B. VERIZON'S CLAIMED INTEROFFICE DEDICATED TRANSPORT COSTS

3

1. CORRECTION OF PORTS PER NODE CALCULATION

4
5

Q. HOW DOES VERIZON PROVIDE FOR INTEROFFICE DEDICATED TRANSPORT IN ITS COST STUDY?

6 A. In conducting its purported forward-looking economic cost study, Verizon's cost

7 model uses SONET rings to provide interoffice transport. SONET rings are a

8 technology that allows for electrical (DS0, DS1, DS3, and STS1) and optical (OC-

9 3 and OC-12) circuits to be easily added to or removed from a transport ring that

10 provides protected (or redundant) transmission between nodes on the ring.

11 SONET nodes are the point where dedicated transport circuits enter and exit the

12 fiber optic ring. The terminal equipment at these SONET nodes convert electrical

13 signals into optical signals, when needed, and multiplexes these signals up to the

14 appropriate speed. SONET terminal equipment comes in several different

15 bandwidths or "speeds." OC-48 SONET equipment is able to transmit signals at

16 approximately 2448 megabits per second. This is the SONET ring transmission

17 speed Verizon has used in its cost study for interoffice facility cost. The capacity

18 of an OC-48 SONET depends on the type of SONET ring that has been deployed.

19 Verizon's assumption that the capacity of an OC-48 SONET ring of 48 DS3s is

20 reasonable, although the capacity can actually be greater.

21
22
23

Q. WHAT IS THE RELATIONSHIP BETWEEN THE OC-48 SONET RING USED BY VERIZON AND THE NUMBER OF NODES ON THE SONET RING?

24 A. For every DS3 that is placed on a SONET ring, two ports must be used for the

25 DS3 circuit – one at each of the nodes over which dedicated transport circuit is

1   moving. In other words, if the capacity of an OC-48 SONET ring were

2   determined to be 48 DS3s, then 96 ports would be needed for the 48 DS3 circuits

3   operating between the nodes on that SONET ring. A key issue is the number of

4   nodes on a SONET ring, but the general principle is that the larger the number of

5   nodes on the ring serving these 96 ports, the lower the utilization of any one of

6   those individual nodes. Each of the OC-48 SONET nodes has the ability to

7   actually terminate 48 DS3 circuits. As such, as more nodes are added to each

8   SONET ring, the potential utilization of the SONET nodes on those rings

9   decreases.

10 **Q.** **DOES VERIZON'S ASSUMPTION CONCERNING THE NUMBER OF**
11   **NODES AND PORTS ON A SONET RING RESULT IN REASONABLE**
12   **COSTS FOR DEDICATED TRANSPORT?**

13 **A.** No. Verizon has significantly understated the number of ports that must be used

14   at each SONET node to provide 48 DS3 circuits on the SONET ring.[101] As a

15   result, Verizon has significantly overstated its investment per DS3, which results

16   in substantially inflated dedicated interoffice transport costs.

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[101] Verizon has also significantly understated the number of ports that must be used at each SONET node to provide 48 STS1 circuits and 16 OC-3 circuits.

1 Q. **IN WHAT WAY HAS VERIZON SIGNIFICANTLY UNDERSTATED THE**
2   **NUMBER OF PORTS USED ON ITS SONET RINGS IN ITS COST**
3   **STUDY?**

4 A. Verizon indicated in its interoffice dedicated transport cost study that the capacity

5   of an OC-48 Bi-directional Line Switched Ring ("BLSR") is 48 DS3s.[102] In

6   addition, Verizon asserts that it has on average 3.79 nodes per SONET ring.[103] As

7   we explained above, to support 48 DS3s within a SONET ring, 96 ports must be

8   available within the SONET nodes because each DS3 must have a port to enter

9   the SONET ring at one node and a second port to depart the SONET ring at

10   another node.[104] Consequently, given Verizon's assumptions of 48 DS3s per

11   SONET ring and 3.79 nodes per SONET ring, each node must have on average

---

[102]   Workpaper Part D-2, VA PART D-2 IOF_MODEL Workbook, "Parameters"
        Spreadsheet, Row 373. The assumption of 48 DS3s per OC-48 BLSR is actually a
        conservative estimate. In reality, BLSR SONET rings can support more than 48 DS3s
        depending on the number of nodes on the ring and on the network engineering applied.
        The engineering rule is that no cross section between two nodes on the SONET ring can
        exceed 48 DS3s. This engineering rule, though, can permit more than 48 DS3s on the
        SONET ring as a whole. In short, while the remainder of this testimony will accept
        Verizon's assumption of 48 DS3s per OC-48 SONET ring (but account for this
        assumption correctly), the Commission should realize that this is a very conservative
        assumption from a cost standpoint.

[103]   Workpaper Part D-2, VA PART D-2 IOF Eng_SUP Workbook, Cell B14. In other
        proceedings (*e.g.,* New York and Massachusetts), Verizon has explicitly stated the
        average number of ports per ring in the interoffice dedicated transport cost studies.
        Verizon then multiplies this value of ports by the average distance between nodes to
        arrive at an average distance per ring. In Verizon's FCC filing, Verizon failed to state
        explicitly the average number of ports per ring or the average distance between nodes but
        instead embedded these two pieces of information in Cell B14. The 3.79 value, however,
        compares reasonably with the values found in New York (3.76 nodes per ring) and
        Massachusetts (3.83 nodes per ring).

[104]   The discussion of the number of nodes per ring is to the "logical" number of nodes that
        are on a particular SONET ring. Often there will be many more "physical" nodes on
        fiber rings where the fiber passes through the node, but SONET electronics are not
        placed on that node. The important factor for developing the number of ports per node is
        the number of "logical" nodes per ring that have electronics at those nodes.

1 approximately 26 ports.[105] Verizon's interoffice dedicated transport cost study,

2 however, assumes only 16 ports per node, understating the number of required

3 ports in its cost study by 38.5%.[106]

4 Q. **HOW DID VERIZON MAKE ITS FLAWED CALCULATION OF**
5 **INTEROFFICE DEDICATED TRANSPORT COSTS?**

6 A. It appears that Verizon took the 48 DS3s per SONET ring and divided by three

7 nodes (the more conservative of the whole number of nodes comprising the

8 average of 3.79 nodes) and calculated 16 ports. Verizon's flawed methodological

9 approach, however, failed to account for separate entry and exit ports on different

10 nodes on the ring. Thus, if a DS3 uses 16 ports to enter the ring on one node it

11 also needs 16 ports on a separate node to exit the ring for a total of 32 required

12 ports.[107]

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[105] Mathematically, the 26-port figure is derived as follows: The 3.79 nodes per ring average indicates that Verizon's SONET rings generally have either 3 or 4 nodes per ring. For the 3-node rings, assuming 96 ports are available on the ring, there are on average 32 ports per node (96 ports / 3 nodes). For the 4-node rings, again assuming 96 ports on the ring, there are on average 24 ports per node (96 ports / 4 nodes). Given the average of 3.79 nodes per ring, the 3-node scenario would occur 21 percent of the time and the 4-node scenario 79 percent of the time. Using this distribution to determine the number of ports per node yields a total of 25.68 ports per node (32 * 0.21 + 24 * 0.79). We have rounded this value to 26 ports for our analysis.

[106] Verizon uses a 75 percent fill factor in developing the cost for interoffice dedicated transport. This factor has not been altered in the restated cost study. However, Verizon's understatement of the capacity of the OC-48 is only compounded by this fill factor.

[107] In another proceeding, Verizon has claimed that the forward-looking number of nodes per ring should be six, thereby supporting the 16 ports for node that Verizon was using. (*See* State of New York Public Service Commission, *Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements*, Case 98-C-1357, Workpaper Part C-1 – Section 1.0 to the Panel Testimony of Bell Atlantic – New York on Revised Costs and Rates for Unbundled Network Elements
(footnote continued)

1   Q.   **HOW DOES THIS FAILURE TO INCLUDE THE APPROPRIATE**
2   **NUMBER OF PORTS PER NODE IMPACT VERIZON VA'S COST**
3   **ANALYSIS?**

4   A.   The bulk of the cost associated with SONET rings is fixed based on physically

5   establishing the SONET node. As a result, the vast majority of the investment is

6   incurred whether one DS3 or 48 DS3s are in service at the particular SONET

7   node. In its cost analysis, Verizon averages the total cost of the SONET ring

8   across the number of ports that are available at the SONET node. Under

9   Verizon's cost analysis, the lower the number of ports, the greater the cost; the

10   greater the number of ports, the lower the cost. Thus, the average number of ports

11   per node must be accurately determined so as to not misstate the average

12   investment per port. By understating the number of ports per node by 38.5% for

13   DS3s, Verizon has significantly overstated the investment per DS3 in its cost

14   calculation. As a result, Verizon's claimed interoffice dedicated transport costs

15   are similarly inflated.

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and Related Wholesale Services, February 24, 2000, p. 6 (line 372). [Exhibit 323 in the New York UNE cost proceeding] This document shows that Verizon did not report that it was using six nodes per ring, but rather 3.79 nodes per ring.) Verizon's claim is simply not plausible. Given the growth in data traffic and related growth in transport necessary to support such traffic, the forward-looking impact on SONET network engineering is to realize *smaller* numbers of nodes per ring – not *larger* number of nodes per ring. It simply is not reasonable for Verizon to argue that the forward-looking number of nodes per ring is higher than approximately 3.79.

Some networks are migrating away from OC-48 transport to OC-192, effectively quadrupling the capacity of the transport network. In doing this, ILECs can increase the number of nodes per ring, but the unit cost per DS3 is significantly reduced as a result of the increased number of ports available in moving from OC-48 to an OC-192 network.

1　Q.　**IN YOUR RECALCULATION OF VERIZON'S INTEROFFICE**
2　　　**DEDICATED TRANSPORT COSTS, DID YOU USE THE 3-NODE**
3　　　**ASSUMPTION USED BY VERIZON?**

4　A.　No. This assumption is not consistent with 3.79 nodes per SONET ring average

5　　　used by Verizon in its cost study. The 3.79 nodes per ring is an appropriate figure

6　　　that should be used consistently in the Verizon cost study.

7　Q.　**DO THE INFLATED DS3 COST CLAIMS AFFECT VERIZON'S**
8　　　**CLAIMED COSTS FOR OTHER SPEEDS OF DEDICATED**
9　　　**TRANSPORT?**

10　A.　Yes, Verizon used the DS3 Dedicated Transport cost study as the basis for the

11　　　DS1 and DS0 Dedicated Transport cost studies, and this flawed analysis likewise

12　　　resulted in inflated cost claims for DS1 and DS0 dedicated transport.

13　　　Consequently, the required correction to Verizon's DS3 Dedicated Transport cost

14　　　study must also be made in these downstream cost studies. Verizon also made the

15　　　same type of error in its STS-1 and OC3 Dedicated Transport cost studies. The

16　　　correct number of ports per node for these speeds of dedicated transport using the

17　　　approach detailed above for DS3s is 26 and nine, respectively for the STS-1 and

18　　　OC3 Dedicated Transport cost studies.[108] Instead, Verizon incorrectly used 16

19　　　and six, respectively, which substantially inflated its claimed costs.

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[108]　An OC-48 SONET ring has a capacity of 48 STS-1 circuits and thus requires 96 STS-1
ports on the nodes of the SONET ring. An OC-48 SONET ring has a capacity of 16 OC-
3 circuits and requires 32 OC-3 ports on the nodes of the SONET rings. An OC-48
SONET ring has a capacity of four OC-12 circuits and requires eight OC-12 ports on the
nodes of the SONET rings. The remaining calculations to determine the number of ports
per node for the SONET rings are identical to those outlined for the DS3 ports.

1 Q. **COULD YOU PLEASE SUMMARIZE THE IMPACT OF THIS**
2   **CORRECTION IN VERIZON'S COST STUDY FOR THE VARIOUS**
3   **FORMS OF DEDICATED TRANSPORT?**

4 A. Yes. The following table sets forth the average investment per port using

5   Verizon's incorrect analysis and the restatement that we have done using

6   appropriate assumptions of the numbers of required nodes and ports for each of

7   the various forms of dedicated transport.[109] The average investment uses the same

8   split between Fujitsu and Lucent equipment as set forth in Verizon's original cost

9   study.

Port Type	Corrected Investment Level for Verizon's Cost Study	Verizon's Claimed Investment Level
OC-48 – OC-3 Ports	$8,828.59	$13,078.47
OC-48 – STS-1 Ports	$2,751.91	$4,351.86
OC-48 – DS3 Ports	$2,730.58	$4,317.20

10

11   **2.   CORRECTION TO PERMIT THE CLEC ELECTION OF**
12   **DCS**

13 Q. **WHAT IS DCS?**

14 A. DCS is an acronym for "Digital Cross-connection System." DCS allows for

15   telecommunications providers to electronically cross connect different speeds of

16   dedicated transport. For example, this piece of equipment allows the

17   telecommunications carrier to take multiple DS1 dedicated transport circuits,

18   entrance facilities, or loops and place them onto a DS3 circuit that can then be

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[109]   Unlike Verizon, which divided three nodes by the 48 DS3s, we used the more accurate
3.79 node average provided by Verizon.

1   carried to another location. This is also referred to as "grooming." Other

2   technology (*e.g.,* ATM switching) is able to perform many of the same functions

3   as DCS with a much lower level of investment. As such, DCS is normally and

4   economically used when the electronic capability available with DCS can best be

5   put to use (*e.g.,* when many changes are expected in the circuits connecting two

6   locations or when the ability to re-provision circuits across different high speed

7   transport is important). ILECs choose when and where to use DCS in dedicated

8   transport circuits based on cost and performance trade-offs. CLECs should have

9   the same opportunity to make this choice through unbundling.

10   **Q.   HOW HAS VERIZON COSTED AND PRICED DCS?**

11   A.   Verizon has averaged the cost of DCS into its prices for interoffice transport.

12   **Q.   IS THIS APPROPRIATE?**

13   A.   No. ILECs choose when and where to use DCS in dedicated transport circuits

14   based on cost and performance trade-offs. With unbundling, CLECs should have

15   the same opportunity to decide when and where to use DCS in dedicated transport

16   circuits.

17   **Q.   DID THE FCC FIRST REPORT AND ORDER PROVIDE THAT ILECS**
18   **SHOULD OFFER DEDICATED TRANSPORT AND DCS SEPARATELY?**

19   A.   Yes. The FCC in its *First Report and Order* specifically refers to the unbundling

20   of DCS from dedicated transport:

21   Accordingly, we conclude that the section 251(d)(2)(B)
22   requires incumbent LECs to provide access to shared
23   interoffice facilities and dedicated interoffice facilities
24   between the above-identified points in incumbent LECs'
25   networks, including facilities between incumbent LECs'

1   end offices, new entrant's switching offices and LEC
2   switching offices, and DCSs. We believe that access to
3   these interoffice facilities will improve competitors' ability
4   to design efficient network architecture, and in particular, to
5   combine their own switching functionality with the
6   incumbent LEC's unbundled loops.[110]

7   The FCC required that the new entrant be permitted to have access to

8   DCS. Simply giving the CLEC access to the DCS equipment does not allow the

9   ILEC to make its use mandatory and include it as an element in its cost study.

10   The CLEC is free to elect not to purchase this element, as other technology

11   affords other alternatives for accomplishing the same functionality as DCS, in a

12   much less costly manner (*e.g.*, ATM switching).

13   **Q.   DOES VERIZON PROVIDE ACCESS TO DCS ON A SEPARATE BASIS**
14   **ALREADY?**

15   A.   Yes. Verizon has a Special Access Tariff (Tariff No. 1) that provides access to

16   DCS functionality known as IntelliMux (see § 7.2.12). This service permits

17   "allows point-to-point rerouting of customer...facilities."[111] Moreover, this tariff

18   states that the price for this DCS functionality is based on the type of port that is

19   acquired – Voice Grade, DS1, or DS3.[112] As such, if the customer wants to

20   connect DS3 Special Access Service to the DCS, the customer must purchase a

21   DS3 network access port at the DCS. In short, this is the appropriate approach to

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[110]   *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, CC Docket No. 96-98, FCC *First Report and Order*, FCC Docket No. 96-325, Released August 8, 1996, ¶ 447.

[111]   Verizon Special Access Tariff FCC No. 1, § 7.2.12(E).

[112]   Verizon Special Access Tariff FCC No. 1, § 7.2.12(F).

1   establish costs for interoffice dedicated transport for unbundling. Moreover, the

2   FCC explicitly requires that the incumbents make DCS available in the same

3   manner for unbundling that it makes it available for special access.[113]

4   **Q.   DO THE INTERCONNECTION AGREEMENTS BETWEEN AT&T AND**
5   **VERIZON, AND WORLDCOM AND VERIZON GIVE THE CLECS THE**
6   **OPTION OF PURCHASING DCS WITH DEDICATED TRANSPORT?**

7   A.   Yes. Attachment 2 § 10.3 of the agreement between AT&T and Verizon provides

8   that dedicated transport includes DCS as an *option* where available. Similarly,

9   Attachment 3, § 10.2.4 of the agreement between WorldCom subsidiary

10   MCImetro Access Transmission Services, Inc. and Verizon requires Verizon to

11   "offer DCS and multiplexing, both with and separately from Dedicated

12   Transport."

13   **Q.   DOES THE NETWORK CONFIGURATION THAT VERIZON IS USING**
14   **PERMIT IT TO SEPARATE DCS FROM THE DEDICATED**
15   **TRANSPORT?**

16   A.   Yes. Based on the diagrams provided by Verizon with its cost study, Verizon

17   always places DSX cross-connect points on each side of the DCS. As such, the

18   dedicated transport, which appears at the DSX, can be readily separated from the

19   DCS, which also appears at the DSX, so that the CLEC can either purchase

20   dedicated transport with DCS (if DCS is available) or without DCS.

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[113]   FCC *First Report and Order*, FCC Docket No. 96-325, ¶ 444.

1 **Q.** **HOW HAVE YOU RECALCULATED VERIZON'S COST STUDY TO**
2   **CORRECT THIS ERROR?**

3 **A.** We have stated the cost of DCS as a separate element. Effectively, we have taken

4   Verizon's investments for DCS already included in its dedicated transport cost

5   studies and separately developed the cost for this element based on the various

6   port types available on DCS. We have made no underlying changes to Verizon's

7   cost for DCS.

8   **3.**   **DEVELOPMENT OF MULTIPLEXING RATES**

9   **Q.** **DID VERIZON PROPOSE A RATE FOR MULTIPLEXING IN THIS**
10   **PROCEEDING?**

11 **A.** No.

12 **Q.** **DID VERIZON PROVIDE UNDERLYING COSTS AND INVESTMENT**
13   **DATA FROM WHICH RATES COULD BE GENERATED?**

14 **A.** Yes. Verizon included the underlying equipment investment cost in its filing for

15   Virginia. However, Verizon has not converted these equipment investment costs

16   into proposed rates for Multiplexing.

17 **Q.** **IS IT UNUSUAL THAT VERIZON DID NOT PROVIDE A COST FOR**
18   **MULTIPLEXING?**

19 **A.** Yes. In recent UNE cost proceedings in New York and in Massachusetts, Verizon

20   provided costs for these elements in its cost studies and proposed rates for

21   Multiplexing to those respective commissions.

22 **Q.** **WHY ARE MULTIPLEXING RATES IMPORTANT?**

23 **A.** Multiplexing enables the CLEC to take entrance facilities at lower transport

24   speeds (*e.g.*, as DS1) and combine these together through unbundled access to

1   multiplexing to take advantage of higher speed interoffice dedicated transport.

2   Without Multiplexing, CLECs will be severely limited in the manner in which

3   they can utilize interoffice dedicated transport.

4 **Q.**   **HOW HAVE YOU APPROACHED VERIZON'S FAILURE TO PROVIDE**
5   **MULTIPLEXING RATES?**

6 **A.**   Our restatement of Verizon's cost in this proceeding includes Multiplexing costs

7   in two forms: DS1 to DS0 Multiplexing and DS3 to DS1 Multiplexing, as

8   Verizon did in similar proceedings. We rely on the underlying equipment

9   investment costs Verizon has proposed in this proceeding before the FCC in

10   making this cost calculation. The details for how the calculations were made can

11   be found in our supporting work papers.

12   **4.**   **CORRECTION TO TRANSPORT EQUIPMENT IN-PLACE**
13   **FACTOR**

14 **Q.**   **FIRST, WHAT IS AN IN-PLACE FACTOR?**

15 **A.**   In most instances, Verizon has determined the material investment for each of the

16   elements in its cost study. However, it has not separately identified the

17   installation and miscellaneous costs necessary to put the material investment

18   operation – or "in-place." The in-place factor is intended to gross up the material

19   investment to represent the total installed cost of telecommunications equipment.

20 **Q.**   **WHAT IS THE IN-PLACE FACTOR FOR TRANSPORT EQUIPMENT**
21   **PROPOSED BY VERIZON?**

22 **A.**   Verizon has proposed an in-place factor for transmission equipment of 53.2% in

23   Virginia.

1   Q.   **WHAT IS YOUR CONCERN WITH THE IN-PLACE FACTOR USED BY**
2   **VERIZON?**

3   A.   First, Verizon has used an in-place factor that is not representative of TELRIC

4   cost for this element. In our experience, the in-place cost for transmission

5   equipment should be in the 30% range. Verizon has proposed an in-place factor

6   for transmission equipment of 53.2% in Virginia, which is significantly higher

7   than any cost-based in-place factor we have seen. Second, Verizon has not

8   separately identified the installation and miscellaneous costs that go into its in-

9   place factor. It is therefore impossible to verify Verizon's claimed costs.

10 Q.   **WHAT IN-PLACE FACTOR WOULD YOU RECOMMEND FOR**
11   **VIRGINIA?**

12 A.   In the New York UNE cost proceeding, Verizon presented a transmission

13   equipment in-place factor of 36.4%.[114] There is no reason to believe that

14   installation costs in Virginia should be 46% greater than the 36.4% factor used in

15   New York. Verizon uses the same equipment vendors for transport equipment in

16   New York as in Virginia, so it is unlikely that such a large difference is

17   supportable. In short, in light of the large difference between Verizon's in-place

18   factor in Virginia as compared to New York, we would recommend that the

19   Commission use the value which Verizon presented in the New York proceeding.

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[114]   State of New York Public Service Commission, *Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements*, Case 98-C-1357, Workpaper Part C-1 – Section 1.0 to the Panel Testimony of Bell Atlantic – New York on Revised Costs and Rates for Unbundled Network Elements and Related Wholesale Services, February 24, 2000, p. 3. Please note that this exhibit can also be found as Exhibit 323 in the New York UNE cost proceeding.

1   **C. SUMMARY OF CORRECTIONS TO VERIZON'S INTEROFFICE**
2   **DEDICATED TRANSPORT COST STUDY**

3   **Q.   COULD YOU PLEASE SUMMARIZE THE INTEROFFICE DEDICATED**
4   **TRANSPORT RATES THAT RESULT FROM YOUR CHANGES TO**
5   **VERIZON'S COST STUDY?**

6   A.   Yes. The following table summarizes the proposed rates for interoffice dedicated

7   transport that are derived from our restatement of Verizon's cost study based on

8   the criticisms and corrections identified above. These modifications also

9   incorporate the annual cost factors and overhead factors addressed earlier in this

10   testimony.

11

Rate Element	AT&T Monthly Rate	Verizon Monthly Rate
DS0 Dedicated Transport (Fixed)	$20.23	NA
DS0 Dedicated Transport (Per Mile)	$0.29	NA
DS1 Dedicated Transport (Fixed)	$43.66	$54.76
DS1 Dedicated Transport (Per Mile)	$2.46	$3.91
DS3 Dedicated Transport (Fixed)[115]	$198.88	$499.44
DS3 Dedicated Transport (Per Mile)	$33.53	$59.11
STS-1 Dedicated Transport (Fixed)[116]	$200.24	$502.99
STS-1 Dedicated Transport (Per Mile)	$33.61	$59.11
OC-3 Dedicated Transport (Fixed)[117]	$584.64	$1,441.40
OC-3 Dedicated Transport (Per Mile)	$102.95	$178.07

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[115]   It is difficult to precisely compare the AT&T/WorldCom and Verizon proposed rates for
dedicated transport in that Verizon has averaged DCS investment into its rates rather
than allowing CLECs to elect this UNE if it wants to as does Verizon. Nonetheless, for
DS3 dedicated transport, allowing CLECs to elect DCS accounts for 12.3% of the
investment difference between AT&T/WorldCom and Verizon.

[116]   For STS-1 dedicated transport, allowing CLECs to elect DCS accounts for 12.2% of the
investment difference between AT&T/WorldCom and Verizon.

[117]   For OC-3 dedicated transport, allowing CLECs to elect DCS accounts for 14.4% of the
investment difference between AT&T/WorldCom and Verizon.